Affective Polarization: Over Time, Through the Generations, and During the Lifespan

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Abstract

The continual rise of affective polarization in the United States harms trust in democratic institutions. Scholars cite processes of ideological and social sorting of the partisan coalitions in the electorate as contributing to the rise of affective polarization, but how do these processes relate to one another? Most scholarship implicitly assumes period effects—that people change their feelings toward the parties uniformly and contemporaneously as they sort. However, it is also possible that sorting and affective polarization link with one another as a function of age or cohort effects. In this paper, I estimate age, period and cohort effects on affective polarization, partisan strength, and ideological sorting. I find that affective polarization increases over time, but also as people age. Age-related increases in affective polarization occur as a function of increases in partisan strength, and for Republicans, social sorting. Meanwhile, sorting only partially explains period effects. These effects combine such that each cohort enters the electorate more affectively polarized than the last.

Keywords Affective polarization · Age-period-cohort · Ideological sorting · Social sorting · Political socialization

Introduction

The percentage of Americans expressing affective polarization—a marked difference in warmth towards co-partisans as opposed to the opposing partisans—has dramatically risen since the late 1970s (Abramowitz & Webster, 2018; Iyengar et al., 2012; Mason, 2015). Understanding the rise of partisan animus and its consequences has become a major priority for political scientists due to its negative implications for the functioning of democracy and society. For example, opposing partisans routinely discriminate against each other in economic (Amira et al., 2020;

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Engelhardt & Utych, 2020; Iyengar & Westwood, 2015; McConnell et al., 2018) and social (Lelkes & Westwood, 2017; Nicholson et al., 2016; Shafranek, 2021) settings. Affective polarization is also thought to deplete overall trust in institutions as trust is now increasingly dependent on whether people see their party as in control (Hetherington & Rudolph, 2015).

Many attribute the aggregate rise of affective polarization to ideological and social sorting. Since 1964, ideological differences between the parties increased, increasing the overlap between ideological and partisan identities. In turn, this strengthened partisan identities, widening the difference between in-party and out-party affect (Abramowitz & Webster, 2018; Levendusky, 2009; Mason, 2015). Simultaneously, the parties diverged along demographic lines, leading to increased race-party and religion-party overlap that contributes to polarization in group affect (Ahler & Sood, 2018; Mason, 2016, 2018; Mason & Wronski, 2018). Other work would also point to the rise of partisan media as an antecedent of affective polarization (Druckman et al., 2019; Iyengar et al., 2012).

These explanations locate the source of changes in gradual, uni-directional trends external to the citizen, but they do not specify how societal changes contribute to attitude change. One possible mechanism is life cycle effects—affective polarization changing concomitant with changes in cognition and social roles in the life cycle. If aging were associated with affective polarization independent of the flow of history, the near doubling of the percentage of Americans over 60 years old (Mather et al., 2015) could account for increasing polarization. A second possibility is period effects—affective polarization changing in response to contemporary events. A third possibility is cohort effects—different age cohorts having distinct levels and/or trajectories in their affective polarization based on differences in conditions during their formative years. Generational replacement then translates cohort effects into aggregate change. These mechanisms are not mutually exclusive—all three can operate at the same time.

In this paper, I find period effects are the strongest, but aging matters too. As people age, in-party warmth increases while out-party warmth largely remains the same, contributing to higher affective polarization. Over time, observed affective polarization increases because both in-party and out-party warmth decrease, but out-party warmth's decrease is more dramatic. There are no clear cohort effects on affective polarization specifically, but there is some evidence that the Baby Boomer generation is chronically lower in both in-party and out-party warmth. These findings have two important implications. First, period effects lead each new cohort to enter the electorate to be more polarized than the last: citizens have strong levels of affective polarization even before they enter the voting booth. Second, for the burgeoning literature on reducing affective polarization (Ahler & Sood, 2018; Klar, 2018; Levendusky, 2018a, 2018b; Shafranek, 2020), these results indicate that affective polarization is malleable and subject to change throughout the life-span. The presence of age effects raises the need to apply a socialization lens to affective polarization.

Partisanship as a Social Identity

Affective polarization refers to dislike and distrust of opposing partisans among members of the electorate, operationalized as a difference in warmth extended to one's own partisans as opposed to co-partisans (Iyengar et al., 2012). Commonly, its rise is understood through the lens of Social Identity Theory. People internalize their partisan affiliations as part of their senses of self (Green et al., 2002; Huddy et al., 2015), and want to feel positively about the groups they identify with (Brewer et al., 1993). In times of competition—for example, between parties in elections (Marshall, 2019; Miller & Conover, 2015)—people are motivated to see their group as positively *distinctive*—that is, better than other competing groups. People respond to this desire by intensifying favoritism towards their own group, antagonism towards the out-group, or both (Tajfel & Turner, 1979).

Sorting Theories of Affective Polarization

Social Identity Theory further argues that people have a constellation of group identities, each with their own boundaries of who is "in" and who is "out." (Roccas & Brewer, 2002) Drawing on shared commonalities on one identity dimension can constrain prejudice towards outgroup members on another (Brewer & Pierce, 2005). However, when several identity dimensions overlap—that is, contain the same kinds of people, they lack such a resource.

Two transformations in the partisan coalitions in the electorate have increased the overlap between partisanship and other identities. Since the 1960s, precipitated by increases in elite polarization (McCarty et al., 2006), the partisan coalitions have ideologically sorted, with liberals (conservatives) gravitating towards the Democratic (Republican) party (Green et al., 2002; Levendusky, 2009). Simultaneously, the partisan coalitions have socially sorted. Democrats are increasingly a coalition of college-educated (sub)urban whites, racial, ethnic, religious and sexual minorities and women, while Republicans skew increasingly older, male, rural, white and Christian (Mason, 2018; Mason & Wronski, 2018). Both of these trends reduce partisans' commonalities with opposing partisans, making the opposing party easier to dislike.

Scholars employ a variety of techniques to examine the effects of sorting on affective polarization. The most common research design is to use the pooled American National Election Study to establish increasing ideological and demographic differences between Democrats and Republicans (Bougher, 2017; Iyengar & Krupenkin, 2018; Lelkes, 2018; Mason, 2015, 2018; Webster & Abramowitz, 2017), and treat these macro-level trends as antecedents of cross-sectional variations between individuals. Then, controlling for other factors, they examine the association between sorting and one's level of partisan animus at the individual-level. Others make use of panel data (Bougher, 2017; Mason, 2015) or even experimentally manipulate perceived sorting (Ahler & Sood, 2018), which allow for stronger inferences.

Some of these designs use age as a predictor (Bougher, 2017; Mason, 2015, 2018), but it is always as a demographic control, never as a potential mechanism by which sorting impacts affective polarization. So far, design choices assume tests of ideological and social sorting's effects are purely period effects, and the aggregate implications are that people respond more or less uniformly to changes in their environment. At least two alternative possibilities exist, which I detail next: life cycle effects and generational replacement.

How Age (Life Cycle) Might Impact Affective Polarization

If affective polarization increases with age, and the population is aging, then affective polarization can increase in the aggregate independent of period effects. Life cycle effects need not cancel out estimates of period effects, but pose an important check on them. The United States population is aging (Mather et al., 2015), and if people polarize as they age, an older population pushes the aggregate level of affective polarization upwards. Even small aging effects can have strong aggregate-level implications given that the United States is subject to an aging population. Between 1970 and 2000 alone, the median age of the American population rose from 28 to 35, with the percentage of the population under age 15 declining from 28 to 21% and the population over 65 rising from 9 to 12% (LaPierre & Hughes, 2009). As of 2050, the senior citizen population is projected to expand to 22% (He et al., 2016). Hence, if affective polarization increases with age, the electorate massively increases in affective polarization in the aggregate.

Age effects include both cognitive changes and changes in social role throughout the life cycle. As people age, they tend to become tethered to communities, join voluntary associations, and become parents, all of which stimulate political engagement (Brady et al., 1995; Plutzer, 2002), which then heightens the salience of party differences (Hetherington, 2001). A logical consequence is that partisan strength increases with age (Campbell et al., 1960; Claggett, 1981), which can give way to increases in affective polarization (Iyengar et al., 2012). With aging also comes increased rigidity in beliefs and opinions (Dennis et al., 2008; St. Jacques et al., 2009). Relatedly, older adults also have more difficulty expressing concern for dissimilar others or imputing their cognitive and affective states (Wieck & Kunzmann, 2015; Zhang et al., 2013). Hence, with age may come increased difficulty understanding those with opposing political views or treating them charitably.

With aging can also come increased partisan sorting as partisans gain concrete knowledge of the political context through adulthood (Jennings, 1996; Lau & Redlawsk, 2008). Such knowledge includes information on the parties' issue stances and which groups they cater to. In response to this information, people may change partisan identities (Highton & Kam, 2011), or alter their issue stances and social identities in ways that reflect their partisanship (Carsey & Layman, 2006; Egan, 2020). Either process implies increased sorting with age—another route through which age can impact affective polarization.

How Generational Replacement Might Impact Affective Polarization

Generation effects occur when birth cohorts have different attitudinal patterns from one another as a result of having different experiences (Claggett, 1981). Consistent with the impressionable years hypothesis, which argues that attitudes become less susceptible to change with age (Krosnick & Alwin, 1989; Osborne et al., 2011) generation effects are thought to occur because of events during the formative years. When generational replacement occurs, aggregate opinion changes over time from earlier cohorts leaving the population and later ones with different attitudes replacing them.

It is plausible that as earlier, less polarized cohorts exit the electorate, they are replaced with new partisans who are more polarized. Each succeeding cohort born in the twentieth century has grown up under increasingly divergent partisan coalitions. People born earlier have a more vivid memory of the parties as ideologically heterogeneous coalitions, a time where opposing partisans were less alien. Witnessing changes in the out-party can signal that the opposing partisan coalition is malleable, a perception that can improve attitudes towards them (Wohl et al., 2015). Later cohorts have seen much less change in the parties. Though social sorting is still underway (Zingher, 2018), the process of ideological sorting slowed after the 1990s (Levendusky, 2009; Mason, 2015). Hence, they may not extend as much charity towards opposing partisans as earlier cohorts.

Another reason that earlier cohorts may be less polarized is because they were less well-sorted ideologically and demographically when they settled on their partisan identification. They simply lacked a clear signal of which groups belong in each party (Green et al., 2002) that later cohorts have. Hence, earlier cohorts have more in common with the other side (Roccas & Brewer, 2002), and display less affective polarization as a result.

With these alternative arguments in mind, how do we interpret the aggregate increase in affective polarization over the last 42 years? As subsequent sections indicate, the rise of affective polarization is mostly explained by period effects, but affective polarization also increases with age.

Possible Partisan Differences

In addition to the above possibilities, this paper explores the possibility that all of the above effects differ between Democrats and Republicans. For example, one may expect more robust age-related increases in affective polarization among Republicans. The Republican coalition has become considerably older than the Democratic coalition (Mason, 2018; Mason & Wronski, 2018), and one can argue that older Republicans, by virtue of being more prototypical of their party, are better-sorted into their parties than older Democrats. If better-sorted partisans are more polarized, it is possible polarization increases with age more strongly among Republicans. Cohort differences may also arise if political conditions

in one's formative years leave strong, slow-decaying impressions of the parties (Ghitza et al. Forthcoming). For example, Republicans who grew up during the Depression may display lower dislike of Democrats because of FDR's presidency, while Democrats from that era dislike Republicans more as the party of the Depression (Campbell et al., 1960).

Alternatively, Democrats and Republicans may become more polarized for different reasons. There is evidence that Republicans are more ideologically-driven and Democrats are more social groups-driven in how they assess politics (Grossman & Hopkins, 2016). Indeed, the Democrats' demographic transformation has been more profound than the Republican Party's (Zingher, 2018), and the party's support base now features a number of marginalized groups attempting to improve their position in society (Mason, 2018; Mason & Wronski, 2018). This suggests that that being demographically in tune with one's party (socially sorted) is a stronger mechanism for age-, period-, or cohort-based changes in affective polarization among Democrats. Conversely, being ideologically in tune with one's party (ideologically sorted) may be a stronger mechanism for Republicans.

Research Design

The analyses in this paper take a series of steps. First, I estimate simple age-period-cohort (APC) models to assess the association of each factor in explaining affective polarization. After parsing out which effects exist (as I discuss later, only age and period effects appear to exist), I move on to explaining plausible explanations of these effects. For the purposes of this analysis, these mechanisms are partisan strength, ideological sorting, and social sorting. If the age and period effects on these variables are similar to age and period effects on affective polarization, then I treat them as possible mediators. In the final step, I include these mediators in APC models predicting affective polarization as covariates and assess whether age/period effects remain.

The Age-Period Cohort Identification Problem

My research questions imply a model where affective polarization is a function of age, period and cohort effects in a simple regression framework.

$$Y(Affective Polarization) = \beta 0 + \beta 1(Age) + \beta 2(Period) + \beta 3(Cohort) + \varepsilon \quad (1)$$

This model is represented in Eq. 1 above. Note that the above model is simply shorthand—age, period, and cohort are not continuous variables but instead a series of dichotomous indicators denoting discrete age, period, and cohort groups.

Investigating age, period, and cohort effects simultaneously is not a straightforward task. Age, period, and cohort effects are all theoretically distinct, but statistically, each factor is a perfect linear combination of the other two. Period is represented by the year a respondent was surveyed, cohort by the year the respondent was born, and age how old the respondent was at the time of the

survey. Period = Cohort + Age. Perfectly collinear terms are impossible to estimate in a traditional regression because an infinite number of slopes can fit the data equally well. Therefore, it is impossible to estimate separate age, period, and cohort effects without making some constraints on parameters. This issue with estimating is known as the APC identification problem (Fienberg & Mason, 1979).

One early way of circumventing this identification problem would be to constrain at least one age, period or cohort dummy variable so that a unique solution can be found (Fienberg & Mason, 1978). These constraints are supposed to be imposed according to theory and/or prior information. However, theory is rarely strong enough to determine which effects to constrain as equal, and findings are sensitive to which constraint is used. I lack strong priors as to how to constrain any set of two effects, meaning it is impossible to constrain any effects a priori.

Therefore, I move to two other potential solutions to the APC identification problem that impose less onerous constraints. These assumptions are still strong and untestable outside of simulation data (Bell & Jones, 2013), where the true effect of each component is known in advance (Luo & Hodges, 2020). However, they require less foreknowledge of what the true age, period and cohort effects are to be estimated correctly.

The first is the Intrinsic Estimator, which constrains age, period, and cohort coefficients to sum to 0 (Yang et al., 2004, 2008). Through imposing this assumption, it becomes possible to derive a unique set of coefficients that best fit the available data. In doing so, it assumes that age, period, and cohort effects are a linear combination. If the effect of aging differs by cohort, this model will not pick it up.

The second is the Age Period Cohort-Interaction model, which solves the identification problem by not including cohort coefficients in the model at all. Instead, the model assumes cohort effects can be captured with a series of interaction terms multiplying each age group variable by each period group variable (e.g. age 20 × year 1955; age 20 × year 1960; etc.) Through these interaction terms, it is possible to estimate two different types of cohort effects. The first are cohort-specific means pooled over years. The second are the trajectories of cohorts over time. Through pooling information from the series of interaction terms that can denote the same cohort (e.g. age 20 × year 1955; age 25 × year 1960; and age 30 × year 1965, which all follow people born in 1935), the model can assess cohorts deviate from the grand mean given information from the constituent age and period terms. This requires assuming that all information about cohort effects can be derived from age and period effects, but analyses using simulation data show this is defensible assumption (Luo & Hodges, 2020).

Ultimately, it is impossible to tell using existing theory or real data which assumptions about underlying age, period, or cohort effects are accurate. Hence, my goal with using two identification strategies analyses which conclusions can be made that are robust to various assumptions about the data. If both the Intrinsic Estimator and Age Period Cohort-Identification models converge on the same substantive interpretation, I consider it strong evidence about the nature of age, period, and cohort effects on affective polarization. If the estimators diverge, I interpret the evidence as suggestive at best.

Data

This analysis uses the pooled American National Election Study (ANES). It is the only repeated cross-sectional dataset to contain measures of affect towards each party for an extended length of time. As a series of probability samples of the American public, it contains respondents from a variety of age and cohort groups. Since the survey takes place over multiple years, it is possible to estimate period effects and observe cohorts as they age. In line with most studies on affective polarization (Iyengar et al., 2012; Mason, 2015), I only include partisans (including independent leaners) in this analysis, as only partisans can have an in-party and an out-party.

Measures

Affective Polarization

The ANES cumulative file allows researchers to measure partisan affect in three ways. The most commonly used approach is to calculate the difference in the feeling thermometers for the "Democratic Party" and the "Republican Party." The thermometers measure affect on 0–100 point scales, and have been used since the 1978 wave (Iyengar et al., 2019). However, there are other measures. From 1962–1976 and 1980–1982, respondents filled out feeling thermometers for "Democrats" and "Republicans" on the same 0–100 pt scales—what I call the "old" feeling thermometers, which Iyengar et al. (2012) partially rely on in analysis. In the main analyses, I employ the newer feeling thermometers, but in the Supplementary Materials Tables A8–A13 and Figs. A9–A20, I estimate models using a combination of the "old" and "new" feeling thermometers. These models yield largely the same substantive results, but with small deviations that I note as necessary.

Age, Period, and Cohort

Age is measured as a respondent's age in years. Period is measured as the time period in which the respondent took the survey. Cohort is measured as birth year. In line with common practice in literature using both the Intrinsic Estimator (Yang et al., 2004, 2008) and the Age Period Cohort-Interaction model (Luo & Hodges, 2020), I bin all but the youngest (first) and oldest (last) age, period, and cohort groups into 5-year increments.

Partisan Strength

A dichotomous variable that = 1 if a respondent is a strong Democrat or Republican on the traditional 7-point Party ID scale, and 0 for any other type of partisan.

Ideological Sorting

As per Mason (2015), ideological sorting is the absolute difference between a respondent's self-placement on the 7-point liberalism-conservatism scale and her self-placement on a 7-point party identification scale. This measure is normalized to run from 0 to 1.

Social Sorting

An additive scale of strong partisanship, strong ideology, race, religion, and tea party membership, modeled after Mason (2018). This measure is normalized to run from 0 to 1.

- Strong Partisanship = 1 if a respondent is a strong Democrat or Republican, 0 otherwise.
- Strong Ideology = 1 if a respondent is a "very liberal" Democrat or "very conservative" Republican = − 1 if a respondent is a "very conservative" Democrat or "very liberal" Republican, 0 otherwise.
- Racial Sorting = 1 if a respondent is a Black Democrat, = − 1 if a respondent is a Black Republican, 0 otherwise.

Religious sorting—Mason (2018) measures this as a trichotomous variable that =1 if a respondent is an Evangelical Republican or a secular Democrat, -1 if a respondent is an Evangelical Democrat or a secular Republican, and 0 otherwise. In the ANES cumulative file, since there is no standard measure for denomination throughout all years, I proxy for religious sorting with church attendance, normalized between − 1 and 1. Higher values reflect higher church attendance for Republicans and lower church attendance for Democrats.

Results

Basic Age and Period Effects

As a first step, I ask how much do aging, living in a given period of history, and being born at a particular period of time influence affective polarization? To answer this question, I estimate two APC models: one with Intrinsic Estimator and one with the Age Period Cohort-Interaction (APCI) model. The coefficients for each effect can be understood as deviations from a grand mean (represented through the constant). For effective presentation, I depict the effects graphically, and discuss age, period, and cohort effects separately. The full regression tables can be found in Tables A2 (Instrinic Estimator) and A3 (Age Period Cohort-Interaction Model) in the Supplementary Materials. The models presented here are raw models without controls, as age-period-cohort models are most useful in accounting for descriptive

patterns in data. However, all models estimated here are also estimated with demo-graphic and ideological controls in the Supplementary Materials, with substantively identical results.

The vertical axes in Fig. 1 depict the coefficients for age effects estimated in the APCI model (the left panel) and the Intrinsic Estimator (the right panel). Each coef-ficient represents a deviation from the grand mean of affective polarization, which is a 33–36 point difference in feelings about the in-party vs. the out-party. In both anal-yses, respondents become more affectively polarized with age. From the Intrinsic Estimator's results, those aged 18–25 rate their own party around 29 points higher than they hate the other party. By the age of 70, this figure increases to around 42 points. From age 70, affective polarization either levels off at slightly above the grand mean (as per the Intrinsic Estimator results) or declines significantly before leveling off around the grand mean (as per the Age Period Cohort-Interaction results). This pattern occurs quite clearly among Democrats (see Tables A4, A5, A10, A11 in the Supplementary Materials). For Republicans, age-related increases in affective polarization are robust to the inclusion of controls using the new feeling thermometers, (Tables A6, A7) but not with the "combined" old and new feeling thermometers (Tables A12, A13).

The balance of evidence indicates clear age-related changes in affective polariza-tion during most of the adult life-span independent of the march of history or any specific cohort effect. However, increases in measured affective polarization, as well as increases in inter-partisan discrimination, can come from increases in in-party warmth (McConnell et al., 2018; Nicholson et al., 2016), decreases in out-party warmth (Iyengar & Westwood, 2015), or both (Lelkes & Westwood, 2017). Indeed,
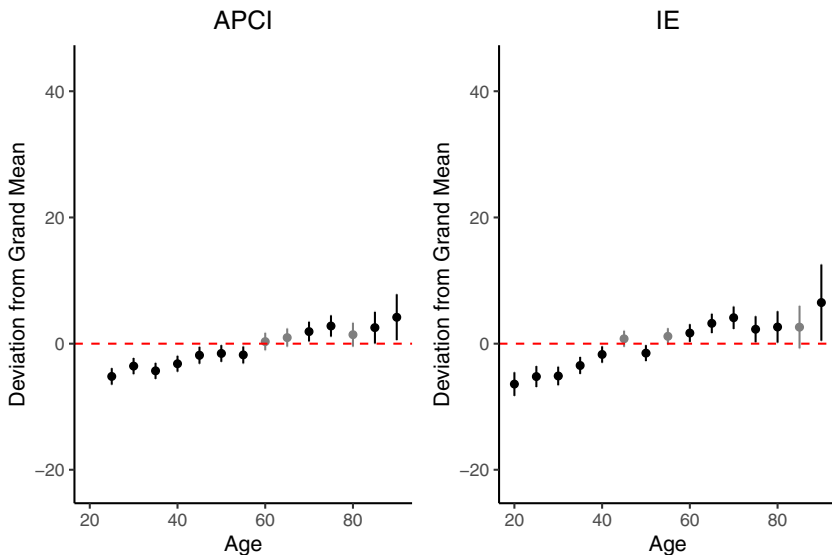

Fig. 1 Effects of age on affective polarization. Significant deviations from the grand mean are black (non-significant gray). Grand mean denoted with red dashed line. *APCI* age period cohort-interaction model, *IE* intrinsic estimator

in-party warmth increases considerably over the life span (11–16 points among Democrats, see Tables A4, A5, 8–11 points among Republicans, see Tables A6, A7). There is less evidence for age-related decreases in out-party warmth. The Intrinsic Estimator detects a faint effect among Republicans, but APCI does not, indicating that increases in in-party warmth are behind the lion's share of age-related increases in affective polarization.

The vertical axes in Fig. 2 above depict deviations from the grand mean in affective polarization over time. Both analyses produce consistent results robust to use of the "combined" feeling thermometers, employing demographic controls, and consistent across parties. Until 1980, affective polarization oscillated at around 27 points. From 1980–1990, affective polarization increased to around 33–35 points, leveling off during the 1990s. By 2016, affective polarization rose up to 41–43 points, the highest on record. These patterns confirm that independent of aging and cohort effects, affective polarization increases over time. Across parties and specifications, this increase in affective polarization comes from both in-party warmth (Tables A14–A25) and out-party warmth (Tables A26–A37) falling over time, but out-party warmth falling faster.

One caveat with drawing conclusions about these age and period effects is that they are derived from repeated cross-sectional samples, and thus cannot speak to how the same set of individuals change with age and/or over time. Therefore, I compare the ANES findings to affective polarization derived from the Youth Parent Socialization Panel in similar years, which follows the Class of 1965 in the year they graduated high school, with follow-up surveys in 1973, 1982, and 1997. In the 1973–1997 surveys, respondents filled out feeling thermometer scores for
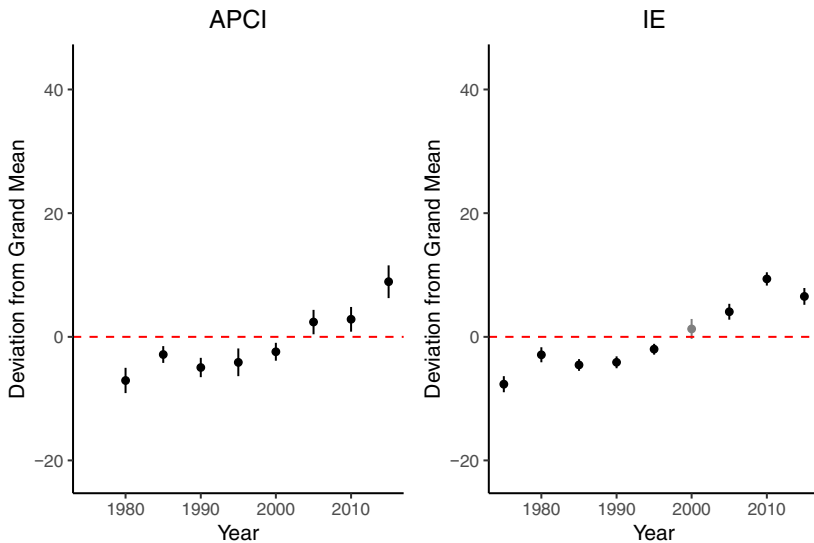

Fig. 2 Effects of period on affective polarization. Significant deviations from the grand mean are black (non-significant gray). Grand mean denoted with red dashed line. *APCI* age period cohort-interaction model, *IE* intrinsic estimator
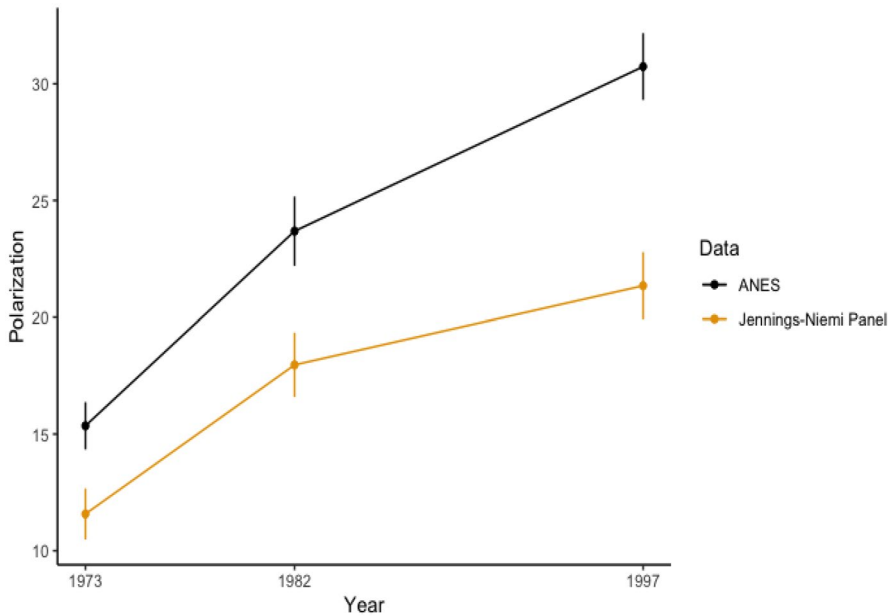
Fig. 3 Comparing ANES and youth parent socialization panel (Jennings-Niemi Panel) respondents in affective polarization scores over time

Democrats and Republicans. Throughout the series, the panel respondents are less affectively polarized than the general population (Fig. 3). However, both they and the population are increasing in their levels of affective polarization. It is impossible to tease apart age and period effects with the Class of 1965 since they are all around the same age, but the fact that they become more affectively polarized over time indicates that attitudes toward the parties indeed can change in people long after young adulthood.

Elusive Cohort Effects

Now, we turn to assessing cohort effects on affective polarization. The vertical axes in Fig. 4 above depict deviations from the grand mean in affective polarization by cohort pooled over all years. The vertical axes in Fig. 5 depict deviations from the grand mean in cohort-specific trajectories with age and over time. The Intrinsic Estimator estimates cohort effects are estimated in the same step as age and period effects. The APCI model derives cohort means from tracing through a series of age × period interactions (e.g. age 25 × period 1955, age 30 × period 1960, age 35 × period 1965), and through tracing the same set of interactions, can derive cohort-specific trajectories.

Overall, there are few clear cohort effects with affective polarization. As indicated on the left panel of Fig. 4, the APCI models detect few significant cohort means that deviate from the grand mean (2 out of 23—1911–1915 and 1936–1940, only one
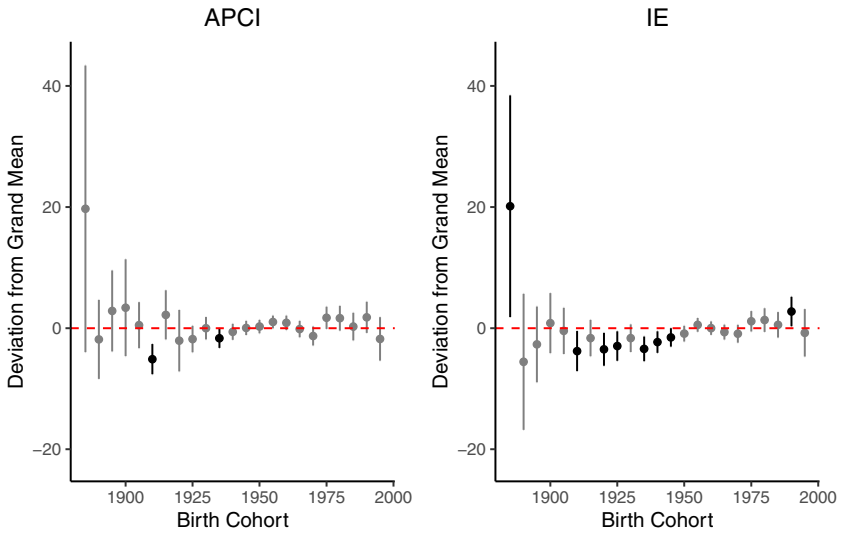
Fig. 4 Effects of cohort on affective polarization. Significant deviations from the grand mean are black (non-significant gray). Grand mean denoted with red dashed line. *APCI* age period cohort-interaction model, *IE* intrinsic estimator
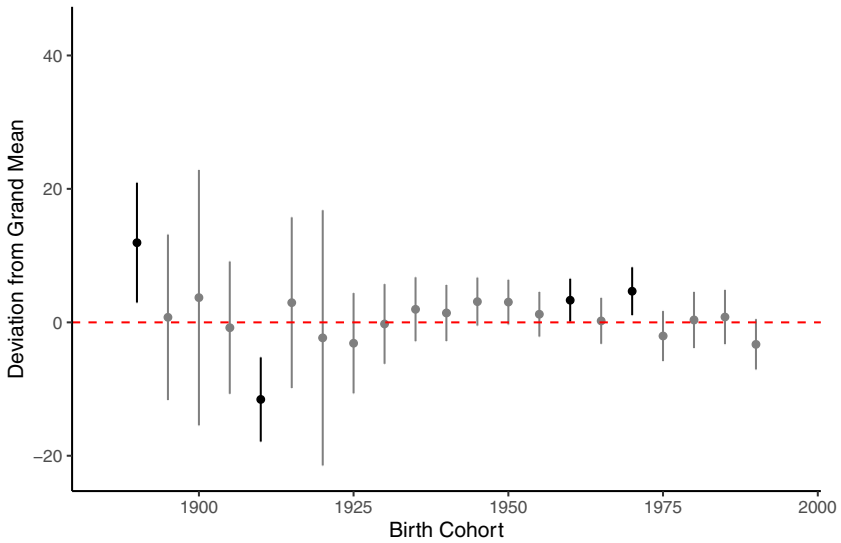

Fig. 5 Cohort trajectories in affective polarization. Significant deviations from the grand mean are black (non-significant gray). Grand mean denoted with red dashed line. Uses age period cohort-interaction model

more than chance). Additionally, as indicated in Fig. 5, only 4 out of 21 cohorts (1891–1895, 1911–1915, 1961–1965, 1971–1975) deviate in their over-time trajectories. The IE analyses, on the surface, appear more promising. They detect that the 1925–1950 cohorts, with one exception, are significantly lower than the grand mean lower affective polarization ($p < 0.05$). This finding is driven by Democrats (Fig. A5). Indeed, the APCI analyses indicate that the 1930–1950 cohorts among Democrats see slower growth in affective polarization, as evidenced by negative cohort trajectories in Fig. A3. One could cite trends such as extraordinarily low levels of Congressional polarization (McCarty et al., 2006) as credible and enduring reasons for this group's lower affective polarization. However, these results do not survive basic demographic controls, rendering these effects unlikely.

That said, broadening the analysis to partisan affect in general, there are more robust cohort effects, at least when using the Intrinsic Estimator. Across most specifications, the 1946–1960 cohorts display both significantly lower in-party warmth (Tables A8–A19) and significantly lower out-party warmth (Tables A20–A31) than the grand mean. Significantly, this bloc consists of the Baby Boomer Generation (Pew, n.d.), who came of age in an era of declining partisan attachment (Jennings & Niemi, 1981). This does not show up as higher affective polarization since the dips in in-party and out-party warmth are comparable. However, this could be a manifestation of a related concept—negative partisanship, which captures simultaneous negativity toward one's own party and the opposing party (Abramowitz & Webster, 2018). These results should be taken with caution, as they are somewhat weaker among Republicans and hold up less with APCI, but they are evidence of some generational imprint on partisan affect.

Why Does Affective Polarization Increase Over Time and During Aging?

In the above analyses, the most robust findings are that partisans become more affectively polarized as they age and as they move through history. In this section, I ask, "Why do we find these effects?" I test three plausible mechanisms that can guide both aging and period effects: partisan strength, ideological sorting, and social sorting.

As people age, partisan identity strength increases (Campbell et al., 1960), and so does concrete knowledge of the political landscape (Jennings, 1996). Such knowledge entails knowing which ideological and social groups associate with which party (Green et al., 2002). With that information, people can become more ideologically and socially well-sorted with age.

These same factors may also be at play over time. Both ideological sorting (Levendusky, 2009; Mason, 2015) and social sorting (Mason, 2018; Mason & Wronski, 2018) represent decades-long changes in how partisanship relates to other social identities. Aggregate partisanship has also strengthened in recent decades (Hetherington, 2001), making it possible that partisan strength has increased over time.

For partisan strength, ideological sorting, and/or social sorting to represent plausible mechanisms that mediate age and period effects, two things need to be true. First, each of these mechanisms are themselves subject to the same kind of

age/period effects that affective polarization is (Iacobucci, 2008). Affective polarization increases mostly linearly with age, and generally increases over time. Second, after these mechanisms are included in the APC analyses, they need to either reduce or eliminate the effects of age and period (Iacobucci, 2008). Therefore, as a first step, I estimate age, period, and cohort effects on ideological and social sorting and partisan strength. Based on whether age or over-time trajectories add up, I then include them in APC models for affective polarization. To display results efficiently, I only include the Age Period Cohort-Interaction models in the main manuscript. Parallel analyses using the Intrinsic Estimator yield substantively identical results and can be found in Figs. A69–A71 (Partisan Strength), A72–A74 (ideological sorting), and A75–A77 (social sorting) in the Supplementary Materials.

The vertical axes in Fig. 6 above depict age effects (left panel) and period effects (right panel) on partisan strength, estimated as each age and period group's deviation from the grand mean. The association between aging and partisan strength displays remarkable similarity with affective polarization. Recall that affective polarization increases linearly until age 70, before leveling off or declining. Partisan strength similarly increases with only one interruption until age 75 before leveling off above the grand mean, among Democrats (Fig. A76) and Republicans alike (Fig. A77). I conclude from this pattern that age-related increases in partisan strength may mediate age-related increases in affective polarization. In contrast, partisan strength displays strong period effects, but partisan strength peaks in 1960s when affective polarization is at its nadir, meaning its trajectory cannot be sufficient to explain affective polarization's rise over time.
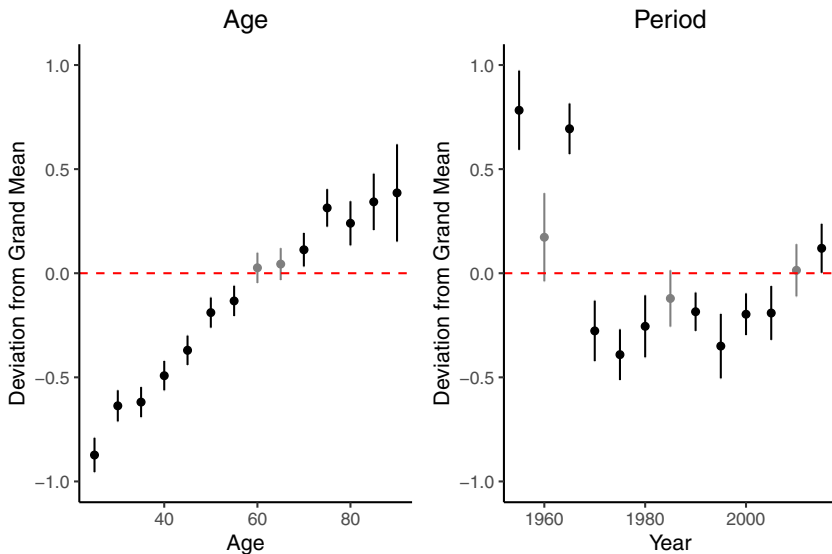

Fig. 6 Effects of age and period on partisan strength. Significant deviations from the grand mean are black (non-significant gray). Grand mean denoted with red dashed line. Uses the age period cohort-interaction model
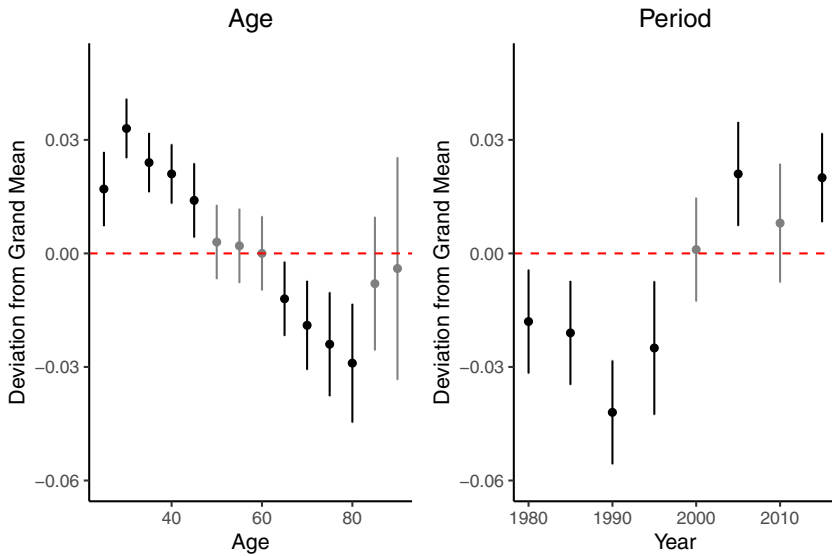
Fig. 7 Effects of age and period on ideological sorting. Significant deviations from the grand mean are black (non-significant gray). Grand mean denoted with red dashed line. Uses the age period cohort-interaction model

Next, I turn to ideological sorting. The vertical axes in Fig. 7 depict age effects (left panel) and period effects (right panel). An aging effect indeed emerges for ideological sorting. However, in direct contrast with affective polarization, ideological sorting *decreases* with age. The pattern differs by party: Democrats are less sorted with age (Fig. A70), while Republicans' level of ideological sorting remains flat with age (Fig. A71). Either way, ideological sorting cannot explain why affective polarization increases with age. In contrast, ideological sorting increases over time. From 2000 onwards, partisans were better-sorted ideologically than in the past. Therefore, it can potentially explain some period effects.

Finally, I turn to social sorting. The vertical axes in Fig. 8 depict age effects (left panel) and period effects (right panel). Levels of social sorting do not deviate from the grand mean for most of the lifespan. The depicted age pattern shows a vaguely positive trend in both the APCI and IE analyses, though in both cases the trend is weak among the full sample of partisans. The trend is similarly inconsistent by method, with a mostly flat trajectory in the APCI analyses until the 2010s but a clear positive trend in the IE analysis (Fig. A72). Breaking out by party reveals diverging party-specific trends. Among Democrats, there is a clear positive trajectory in social sorting over time (Fig. A73), while Republicans are more socially sorted with age (Fig. A74). Hence, social sorting is a viable mechanism explaining age effects among Republicans, but period effects among Democrats.

After estimating APC models on partisan strength, ideological sorting, and social sorting, we are left with a handful of ways in which these mechanisms can explain age and period effects in affective polarization. Age-related increases in partisan strength (and for Republicans, social sorting) can explain why affective polarization
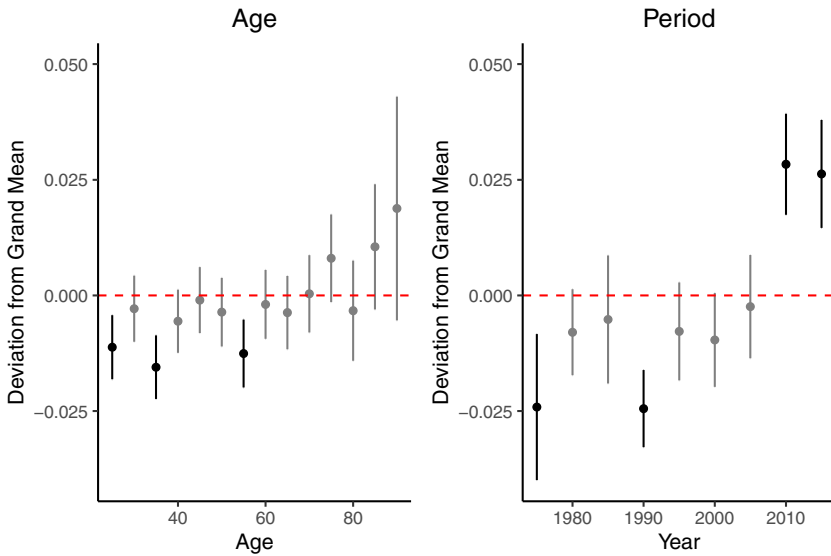
Fig. 8 Effects of age and period on social sorting. Significant deviations from the grand mean are black (non-significant gray). Grand mean denoted with red dashed line. Uses the age period cohort-interaction model

increases with age, and increases in ideological and, for Democrats, social sorting over time can explain why affective polarization increases over time.

The next step is to estimate two separate models. The first is an APC model of affective polarization, including partisan strength as a covariate. I use this model to examine whether partisan strength explains age-related increases in affective polarization. The second is an APC model of affective polarization which includes ideological sorting and social sorting as covariates. Using this model, I examine whether ideological or social sorting explains affective polarization's rise over time (among Democrats) and with age (among Republicans). For efficiency of presentation, I only depict the results of the APCI models in the main manuscript. Analogous models using the Intrinsic Estimator can be found in Tables A2–A7 in Supplementary Materials.

The vertical axes in Fig. 9 depict age-related changes in affective polarization both before (left panel) and after (right panel) controlling for partisan strength. Without including partisan strength in the model, affective polarization increases linearly until age 70, before declining somewhat. After controlling for partisan strength, there are almost no longer any significant age effects. These findings replicate for both Democrats (Tables A4, A5, A10, A11) and Republicans (Tables A6, A7, A12, A13), but most cleanly for Democrats. Therefore, age-related increases in partisan strength play a major role explain age-related increases in affective polarization.

The vertical axes in Fig. 10 depict increases in affective polarization over time both before (left) and after (right) controlling for ideological and social sorting among Democrats. In contrast to Fig. 9, both panels display increases until 1985, a leveling off period until 2000, followed by significant increases through the
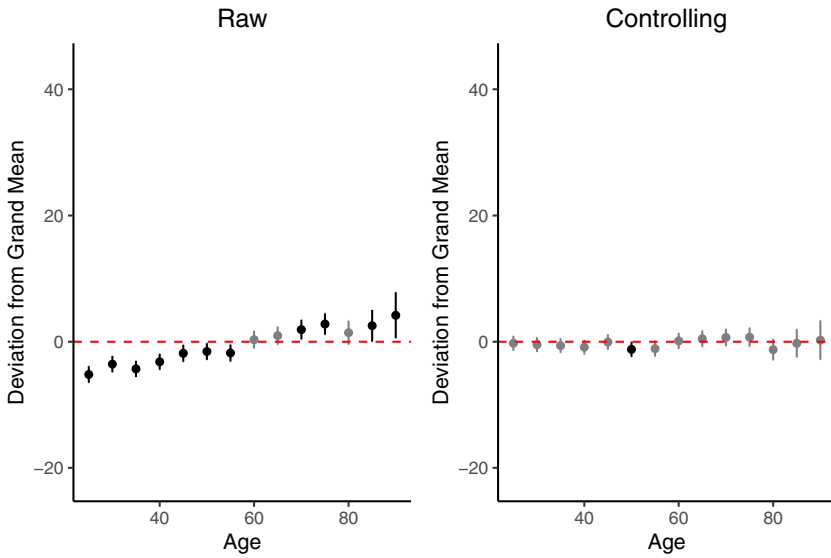
Fig. 9 Effects of age on affective polarization before and after controlling for partisan strength. Significant deviations from the grand mean are black (non-significant gray). Grand mean denoted with red dashed line. Uses the age period cohort-interaction model
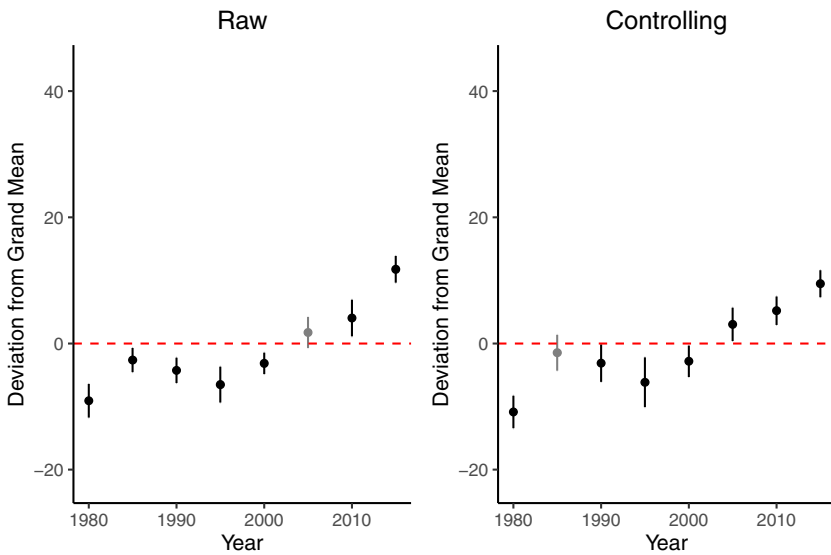

Fig. 10 Effects of period on affective polarization before and after controlling for ideological and social sorting among Democrats. Significant deviations from the grand mean are black (non-significant gray). Grand mean denoted with red dashed line. Uses age period cohort-interaction model
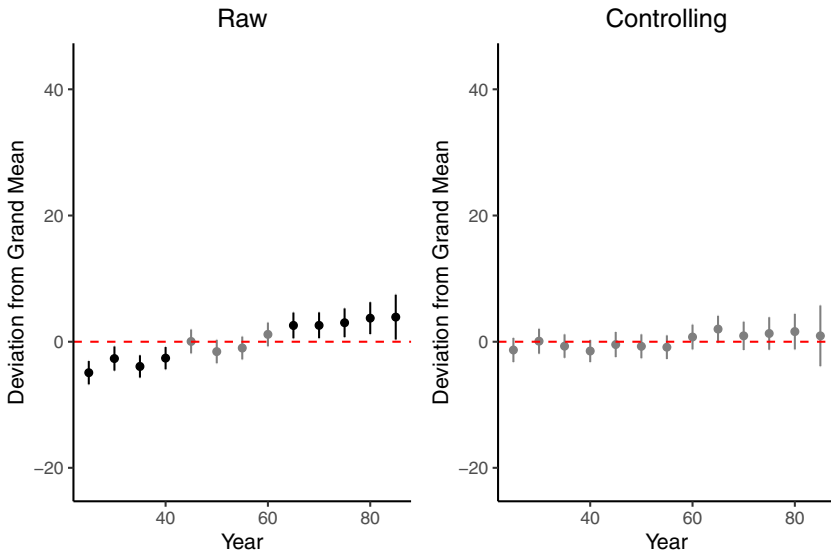
Fig. 11 Effects of age on affective polarization before and after controlling for ideological and social sorting among Republicans. Significant deviations from the grand mean are black (non-significant gray). Grand mean denoted with red dashed line. Uses age period cohort-interaction model

twenty-first century. Including sorting in the model produces slightly flattens the over-time trend, but the overall pattern of affective polarization rising over time remains. This means sorting only partially, at most, explains period effects among Democrats.

The vertical axes in Fig. 11 depict increases in affective polarization with age both before (left) and after (right) controlling for ideological and social sorting among Republicans. In contrast to Democrats with period effects, sorting appears to explain age-related increases in affective polarization among Republicans quite well. Before controlling for sorting (left panel), there is a clear positive age trend in affective polarization. After doing so, aging lacks any separate effect. That said, this effect should be taken with caution, as this finding is not replicated with the Intrinsic Estimator (see Table A6).

What Are the Implications of Age and Period Effects?

In the above analyses, I find that people become more affectively polarized as they age because of age-related increases in partisan strength, and they also become more polarized over time for mostly unknown reasons. Now, I turn to an important implication of these effects.

One important implication is that each new age cohort enters the electorate more affectively polarized than the last. Figure 12 above depicts levels of affective polarization for two different age groups over time. The first, represented with the black line, are respondents aged 18–25. Some in this group have had the opportunity to
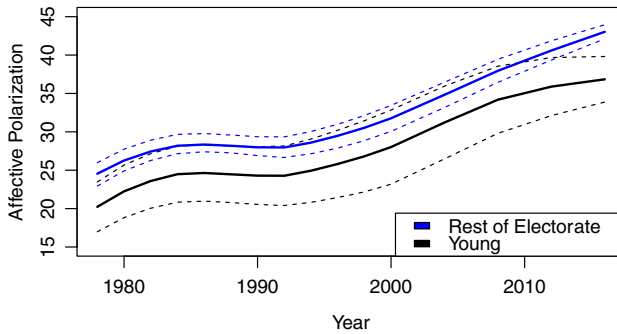
Fig. 12 Levels of affective polarization among respondents aged 18–25. Dashed lines are 95% confidence intervals. Smoothing done through LOESS regression

vote in two elections, but many will have participated in none (Plutzer, 2002). The second group, represented with the blue line, are respondents aged 26 and older. In 1978, the newest partisans liked their own party more than the opposing party by about 20 points. By 2016, this gap more rose to 35 points. This change is statistically and substantively significant. Because affective polarization also increases with age, partisans aged 26 and older tend to be slightly more polarized than their younger counterparts. Since affective polarization generally increases over time, both younger and older partisans are becoming more polarized in parallel. The implications are striking. Far from being blank slates, partisans enter the electorate increasingly affectively polarized.

Conclusion

The study of affective polarization has long recognized the weight of historical forces in shaping contemporary attitudes toward the opposing party. However, the way researchers have modeled these historical effects implicitly assume that partisans' attitudes reflect the immediate political environment. This paper provides strong evidence that such an understanding is incomplete.

To be clear, there are strong period effects. Net of other considerations, affective polarization increases over time, and with important implications. People enter the electorate not as blank slates but as increasingly polarized products of their pre-adult environment. This increase is only slightly explained by over-time increases in ideological and social sorting in the electorate. Furthermore, least some of what we may have considered period effects are actually the result of aging-related increases in affective polarization. These aging effects, in turn, can be contextualized as increases in in-party warmth concomitant with increases in partisan strength over the lifespan.

These aging effects have important implications for the study of affective polarization. The finding that affective polarization changes throughout the lifespan suggests that interventions designed to reduce affective polarization may work among

partisans in a variety of age groups. However, given their disproportionately high turnout rates (Leighley & Nagler, 2013) and increasing share of the population, making sure interventions to reduce affective polarization work among older partisans is crucial to reducing affective polarization in the American partisan population.

Sorting-based theories of affective polarization are meant to explain the rise of affective polarization among the electorate over time. However, the inclusion of individual-level measures of sorting, despite predicting individual-level affective polarization, largely fails to account for period effects among Democrats. This suggests that sorting-based theories of affective polarization need to be adjusted in scope. One possibility is that individual-level sorting does not explain aggregate patterns of affective polarization, but is still able to condition individual identity centrality and feelings towards partisan outgroups (Brewer & Pierce, 2005; Roccas & Brewer, 2002). Hence, sorting can still explain age-related changes in affective polarization among Republicans. This leaves aggregate-level features of the party system related to sorting (e.g. ideological polarization and demographic distinctiveness) as viable. Another possibility is that similar types of citizens (e.g. political sophisticates) are both well-sorted into parties and affectively polarized. Future work should tease apart these possibilities.

There are important limitations to this type of analysis. Intra-cohort trajectories are no substitute for intrapersonal variation. One cannot definitively conclude from this analysis that *individuals* are uniformly susceptible to age- and period-related changes in affective polarization, though individual-level panel data are consistent with what the APC models find. APC models can simulate the life span, but ultimately do so from aggregate data. Additionally, though mediation is useful to explain effects found in age-period-cohort analyses, mediation analyses using repeated cross-sectional data should be treated with caution. While reverse causality is not a threat to inferences (i.e. partisan strength cannot cause people to become 50 years old), one cannot make a definitive claim that that aging *causes* increases in affective polarization because it *causes* increases in partisan strength.

Despite these limitations, these analyses have important implications for understandings of affective polarization. Partisan prejudice is just as important to examine through the lens of the life-span as it is through history. Both are intertwined—age-related changes in attitudes occur contextually, through the social roles people inhabit, through the people they interact with, and through the historical events that unfold during their lives. Similarly, historical changes give shape to aggregate-level changes in the aggregate through affecting the attitudes of at least a subset of partisans. Future work would profit greatly from incorporating the lifespan in more nuanced ways, and with greater use of panel data.

Furthermore, despite a lack of robust cohort differences in affective polarization, aging and period effects have combined to produce a trend where citizens enter the electorate more and more affectively polarized over time. These results are consistent with Boxell et al. (2017), who, despite finding that younger cohorts are rising less quickly in affective polarization over time, find nonetheless younger people are more polarized than in the past. In other words, younger cohorts are experiencing higher levels of affective polarization in their impressionable years. Growing up in a more polarized landscape can leave an as-yet-unknown imprint on younger

generations in the future such that cohort effects emerge in the future. This suggests that there is still a potential impressionable years effect with polarization among younger cohorts. These findings also suggest a need for studying political group attitudes in adolescence or earlier. National election studies only observe people over the voting age, but youth panels can be a powerful supplemental tool.

These results also draw attention to the often-overlooked role of age in public opinion beyond its use as a demographic covariate. Historically, isolating the role of age in public opinion has been difficult due to the difficulty of separating the effect of age from period and cohort. Nevertheless, it is important work. Changes in cognition and social role are widely-experienced, meaning their effects on political life are wide-ranging. Furthermore, estimating and explaining the effect of age can be done with more confidence than in the past. The social sciences have accumulated a number of high-quality repeated cross-sectional datasets that can leverage unprecedented temporal variation, which increases precision in estimates of period and cohort effects (Yang et al., 2004, 2008). Additionally, innovations in APC analysis continue to accumulate that researchers can leverage for more robust conclusions on the role of age in politics.

Declarations

Conflict of interest The author has no conflict of interest to declare.

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